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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/590,264	01/16/2008	Paul A. Kohl	062012-1860	6083
24504 7590 09/04/2009 THOMAS, KAYDEN, HORSTEMEYER & RISLEY, LLP 600 GALLERIA PARKWAY, S.E. STE 1500 ATLANTA, GA 30339-5994			EXAMINER MOHADDES, LADAN	
			ART UNIT 1795	PAPER NUMBER
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/590,264	Applicant(s) KOHL ET AL.	
	Examiner LADAN MOHADDES	Art Unit 1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 15 July 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-30 is/are pending in the application.
- 4a) Of the above claim(s) 1-10 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 11-30 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 18 August 2006 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Election/Restrictions

1. Applicant's election without traverse of Group II, claims 11-30 in the reply filed on 07/15/2009 is acknowledged.

Drawings

2. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they do not include the following reference sign(s) mentioned in the description:

- a. In Fig. 2, layer 14b is not labeled.
- b. Membrane 12b mentioned in page 9, line 3 is not shown in the figures.
- c. Catalyst layer 43 is not shown in Figs. 3B-C.
- d. Substrate 10 mentioned in page 15, line 4 is not shown in Fig 4B.
- e. Reference number 34 in Figs. 3B-C is not mentioned in the specifications.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required

corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Double Patenting

3. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the “right to exclude” granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

4. Claims 11, 16, 17, 18, 20-30 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 24-26, 28-29, 32-33, 39 of copending Application No. 11596607. Although the conflicting claims are not identical, they are not patentably distinct from each other because although claim 11 in instant application does not mention that the membrane has two layers as in claim 24 of Application No. 11596607 but in dependent claims 16-17 of instant application the second polymeric layer of membrane is defined. In addition, although the total thickness of the membrane in both applications is defined between about 0.01 to 10 μm , the thickness of first membrane layer is not defined in the instant application. However, in micro electromechanical applications the deposition of 10-100 Angstrom thick of any of the membrane materials mentioned such as silicon dioxide, silicon nitride and etc. with methods such plasma or chemical vapor deposition is a well known and common practice. The permeability of the membrane recited in claim 25 of Application No. 11596607 is inherent to the membrane material selected and its thickness.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Claim Rejections - 35 USC § 112

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. The term "substantially" in claim 11 is a relative term which renders the claim indefinite. The term "substantially" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention.

7. Claim 13 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. In line 3 of claim 13, applicant recites "the catalyst layer" and "the first porous catalyst layer". However, in claim 12 which claim 13 is dependent upon, the catalyst layer comprises "a first porous catalyst layer". Therefore, in claim 13, it is not clear if the applicant is referring to two catalyst layers or the catalyst layer comprised of the first porous catalyst layer. For the purpose of the compact prosecution, the examiner has taken the position to interpret the claim as the catalyst layer comprised of the first porous catalyst layer.

Claim Rejections - 35 USC § 102/103

8. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

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(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. Claims 11, 14, 18-20 and 24-26 are rejected under 35 U.S.C. 102(b) as being anticipated by, or in the alternative, under 35 U.S.C. 103(a) as being unpatentable over Fonash et al. (US Publication 20020020053, hereafter referred to as Fonash).

Regarding claims 11, 14, 18 and 19, Fonash discloses a fuel cell (paragraph [0004]), comprising: a substrate having anode electrodes disposed thereon (Fig. 9b); a membrane disposed on the anode current collectors (Fig. 9b), wherein the membrane comprises a material selected from silicon dioxide (Fig. 9), wherein the membrane has a thickness of 0.39 μm (Table 9); a hollow channel substantially defined by a portion of the substrate and a portion of the membrane (Fig. 9b), wherein platinum catalyst (as recited in claim 18) layer is exposed to the channel (paragraph [0150]), wherein the anode electrode is disposed adjacent the channel (Fig. 9b); a cathode electrode disposed on the membrane on the side opposite the substrate (Fig. 9b); wherein there is an electrically conductive path between the catalyst layer and the anode current collector (paragraph [0150]). Fonash is silent regarding the membrane having an area resistivity of about 0.1 to 1000 ohms cm^2 . However, area resistivity is dependent on the material property of the membrane and its thickness and therefore by selecting the

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same membrane material and adjusting the thickness the same area resistivity as claimed is obtained.

Alternatively, it would have been within the skill of the ordinary artisan to adjust the thickness or area of the membrane of Fonash to achieve the same area resistivity.

Regarding claim 20 and 26, Fonash also discloses the method for fabricating a fuel cell (paragraph [0031]).

Regarding claim 24, Fonash discloses that the catalyst layer is disposed on portions of the substrate between the sacrificial material portions and the substrate (Fig. 9b and paragraph [0150]).

Regarding claim 25, Fonash discloses that sacrificial material is selected from polymers, silicon dioxide and poly crystalline silicon (glass).

Claim Rejections - 35 USC § 103

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

12. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.

4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

13. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

14. Claims 12, 13, 15, 21, 27 and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over as being unpatentable over Fonash et al. (US Publication 20020020053, hereafter referred to as Fonash) as applied to claims 11, 14, 18-20 and 24-26 above.

Regarding claims 12, 13, 15, 21, 27 and 28, Fonash discloses a catalyst on anode and cathode (paragraphs [0031] and [0150]) but does not disclose that the catalyst layer is porous. However, porous catalytic layers are common in the art for allowing reactant diffusion (as an example see: Suzuki et al. (US Publication 20040247991, paragraph [0003]) and Eikerling et al. (Journal of Electroanalytical Chemistry, 1998, Introduction and Fig. 1)).

15. Claims 16-17, 22-23, and 29-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over as being unpatentable over Fonash et al. (US Publication

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20020020053, hereafter referred to as Fonash) as applied to claims 11-15, 18-21 and 24-28 above, in further view of Ha et al. (US Publication 20040241520, hereafter referred to as Ha).

Regarding claims 16-17, 22-23, and 29-30, Fonash does not disclose a polymer layer disposed on the side of the membrane opposite the substrate, wherein the cathode current collector and the second porous catalyst layer are disposed on the polymer layer, wherein the polymer layer is selected from perfluorosulfonic acid/polytetrafluoroethylene copolymer, polyphenylene sulfonic acid, modified polyimide, and combinations thereof. In the same field of endeavor, Ha teaches a polymeric membrane such as Nafion or Flemion coated with SiO₂ (paragraph [0021-0022]) for the benefit of improving the fuel cell performance and reducing methanol crossover (paragraph [0017]). Therefore, it would have been obvious for the person with ordinary skill in the art at the time the invention was made to use composite membrane of Ha in the fuel cell of Fonash for improving the fuel cell performance.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to LADAN MOHADDES whose telephone number is (571)270-7742. The examiner can normally be reached on Monday to Thursday from 8:30 AM to 6:00 PM (EST).

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached on (571) 272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/LADAN MOHADDES/
Examiner, Art Unit 1795

/PATRICK RYAN/
Supervisory Patent Examiner, Art Unit 1795